pupate and transform. If this is so, and I can see no other explanation, then an occasional individual, favorably placed, may emerge in the fall as a rare "second brood." Four of these fell to Mr. Oslar and became the types of the race that bears his name.

A New Subspecies of Otocryptops gracilis (Wood) from the Eastern United States, together with Remarks on the Status of Otocryptops nigridius (McNeill) and a Key to the Species of the Genus now Known to Occur East of the Rocky Mountains (Chilopoda: Scolopendromorpha: Cryptopidae)

By Ralph E. Crabill, Jr., Department of Entomology, Cornell University

That *Otocryptops* is one of the most primitive genera of the Scolopendromorpha is abundantly evident, not only from its obvious structural proximity to the fundamental *Cryptops*-form but also from the characteristic distributional discontinuities evident in most of its component species. It is no longer surprising, therefore, to discover the same species in widely separated regions of the globe, particularly in North America and eastern Asia, two regions which show numerous other faunal as well as floral similarities. Thus, *sexspinosus, rubiginosus,* and *melanostomus* are known from the the New World, the first two from Alaska and all three from eastern Asia, a characteristic pattern of dispersal.

In contrast to this pattern, the American *gracilis*[1] had been recorded from no area other than California until in 1943 Chamberlin reported its presence in Houston, Texas.[2] With the recognition of a new subspecies on the eastern coast of this continent, the species may be seen to approximate more closely the distributional discontinuities encountered in other members of the genus.

[1] Wood: Journ. Acad. Nat. Sci. Phila., ser. 2, V, p. 38 (1862).
[2] Chamberlin: Proc. Biol. Soc. Wash., LVI, p. 97 (1943).

Considering the distributional pattern of *gracilis,* as we now know it, one may hazard the guess that the species was once distributed widely across the area now comprising the United States in preglacial times and that the various glaciations destroyed the intervening populations, leaving *at least* three relict communities, one in California, and one on the Gulf coastal plain perhaps cut off by the long glacial fingers that accompanied the Sierra Nevada mountains for practically their entire length, and one on the lower eastern elevations of the Appalachians.

It is possible that there is still a *gracilis* population continuum between Texas and California and that the forms of both areas are consubspecific. At any rate there is little doubt in my mind but that the new eastern subspecies has long been effectively isolated from the more western populations, probably by the recurrent glaciations.

I should like to express my gratitude to Dr. Joseph Bequaert of the Museum of Comparative Zoology at Harvard University for his kindness in lending me the paratype of the new subspecies as well as specimens of the nominate subspecies; to Mr. Richard L. Hoffman of Clifton Forge, Virginia, in particular for the gift of the type, and in general for his constant consideration in enriching my collection with southeastern centipedes; and also to the many assiduous collectors who have contributed their time and efforts so generously on my behalf.

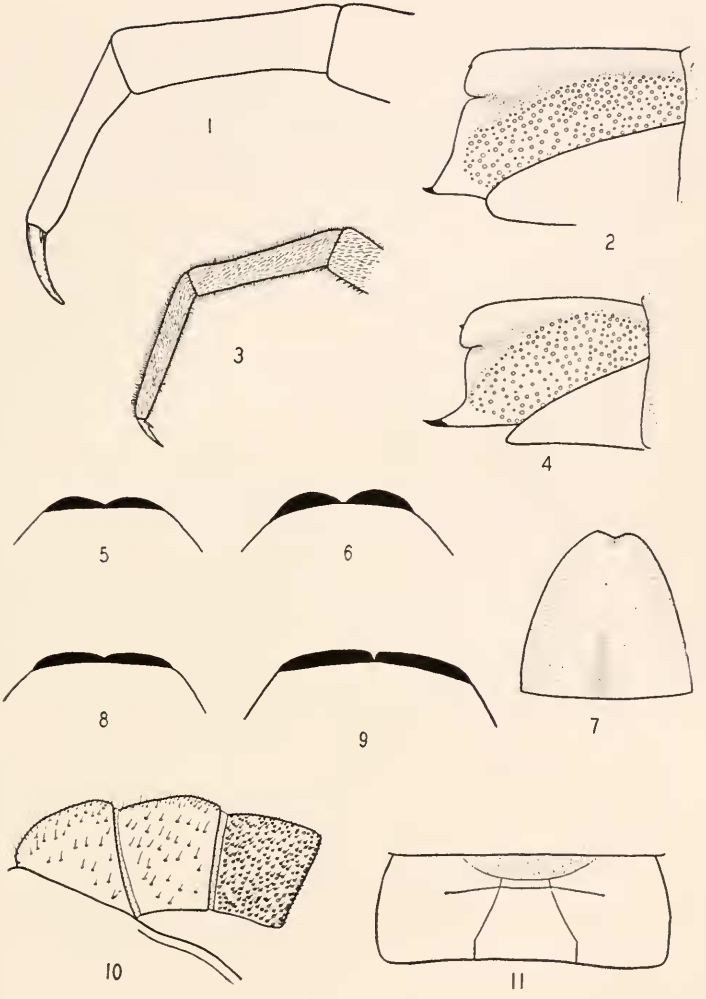
Otocryptops gracilis peregrinator new subspecies

The absence of longitudinal paramedian sulci on the second tergite, and the hirsute ultimate prefemur of the eastern *peregrinator* will serve to differentiate it from the Californian nominate subspecies of *gracilis.*

Type—♀; Charlottesville, Virginia. March 9, 1949. (R. L. Hoffman.) [Author's collection, C–324.]

Female. Length 40 mm. The new subspecies differs from the nominate geographic race in the following features:

General body color light orange-yellow. Second tergite entirely without complete longitudinal paramedian sulci (*cf. gracilis,* fig. 11); third tergite with paramedian sulci incomplete,



FIGS. 1–11

1. *Otocryptops sexspinosus;* ultimate leg tarsal segments. 2. *O. g. gracilis;* right coxopleuron. 3. *O. nigridius;* ultimate leg tarsal segments. 4. *O. g. peregrinator;* right coxopleuron. 5. *O. g. peregrinator;* prosternum. 6. *O. g. gracilis;* prosternum. 7. *O. nigridius;* twenty-third sternite. 8. *O. sexspinosus;* prosternum. 9. *O. nigridius;* prosternum. 10. *O. nigridius;* proximal antennal articles. 11. *O. g. gracilis;* second tergite.

All figures drawn from females. Localities: figs. 1, 3, 7, 8, 9, 10, Sevier County, Tennessee; figs. 2, 6, 11, Santa Cruz, California.

these extending anteriorly from the posterior margin for only one-half the length of the tergite. Distinct lateral tergital marginations beginning on tergite seven (or six), the marginations being generally less distinct than those of the nominate subspecies. Prosternal anterior thickened border thinner than that of the nomniate form (figs. 5, 6). Two apical tibial spines on legs one through nineteen, one on legs twenty and twenty-one, none on the penultimate and ultimate legs; ventral tarsal spines only on legs one through twenty-one. Coxopleural process distinctly longer than that of the nominate form (figs. 2, 4). Pilosity of ultimate leg evident on femur, tibia and tarsus as in the nominate form, but in addition the prefemur densely hirsute, less so dorsally, more so laterally and ventrally, the ventral pilosity extending proximally to the level of the ventral spinous process.

Paratype—♀; Woodside, MARYLAND. (J. E. Benedict.) [In collection of the Museum of Comparative Zoology at Harvard University.]

Female. Length 40 mm. Differing from the type is no important respects. General color very dark due to the obvious age of the specimen. Ultimate legs missing.

Otocryptops nigridius (McNeill) [3]

In his celebrated monograph of the Scolopendromorpha [4] Kraepelin questioned the validity of McNeill's species, suggesting that it was a synonym of *scrspinosus* (Say).[5] In 1930 [6] Attems, unable to include the species in the roster of known North American forms due to its insufficient description, suggested tentatively that it was a synonym of Say's species. Considering the paucity of material in museums generally and the very inadequate original description, it is not surprising that these two astute workers were perplexed.

Relative to their mutual lack of paramedian tergital sulci and their mutual possession of lateral cephalic margins as well as a

[3] McNEILL: Proc. U. S. Nat. Mus., X, p. 333 (1887).
[4] KRAEPELIN: Mt. Mus. Hamburg, XX, p. 72 (1902).
[5] SAY: Journ. Acad. Nat. Sci. Phila., II, p. 112 (1821).
[6] ATTEMS: Das Tierreich, lief. 54, p. 260 (1930).

host of other significant morphological features, it is clear that *nigridius* and *sexspinosus* are more closely related to each other than either is to any other species of the genus. So wide is the latitude of intraspecific variation in all members of the genus in general and in *nigridius* and *sexspinosus* in particular that, lacking a sufficient series to study, it is quite logical to suppose the former to be perhaps a color variant of the latter. However, despite the magnitude of variation in either one of these species in any one locality, it is possible to cite several constant morphological differences that will adequately distinguish one from the other.[7] That *nigridius* is a subspecies or even a genetical anomoly of *sexspinosus* seems to be excluded by the following considerations relative to the geographical distribution of each:

1. If the smaller, darker *nirgridius* were a genetical chance aberration, we could expect it to appear throughout the range of *sexspinosus* but such is not the case for the latter is widespread especially throughout temperate North America, whereas *nigridus* is known to occur only in the midwest (Indiana) and in the unglaciated regions of the Appalachians and their immediate environs. Consequently since the two forms are not everywhere sympatric, it would seem that the possibility of McNeill's species' being a genetical chance anomaly of *sexspinosus* is ruled out.

2. If the two forms were subspecies, we should not expect them both to inhabit the same locality, or if they did, we should expect to discover morphological intergradations between them, but such intergradations are not apparent for I have good series of both forms from Tuscaloosa, Alabama; Clemson, South Carolina: Highlands, North Carolina; and Sevier County, Tennessee, none of which shows any overlap, even though in each case all of the material was taken on the same day, at the same elevation and even in the same immediate area.

The smaller, darker bluish-green tinged *nigridius* may be most easily distinguished from the larger, lighter orange-red *sexspinosus* not only by its general color habitus but also by the aggregations of bluish or purplish tiny blotches that pepper the

[7] Within certain limits color, body length, ultimate leg length and the shape and proportions of the ultimate pedal sternite undergo a striking degree of variation in the same sex and *in the same locality*.

former species, these blotches being especially striking on the otherwise immaculate white ventral leg areas. Other features characteristic of *nigridius* that will differentiate it from *sexspinosus* are the following:

In any locality the *average* size of *nigridius* is less than that of *sexspinosus*. The first and second antennal articles are sparsely hirsute as contrasted with the densely hirsute third article, whereas in *sexspinosus* only the first antennal article is sparsely hirsute (fig. 10). (Next to color this character is the most constant; I have not observed it to vary in any specimen in the East.) Anterior prosternal margin straighter in *nigridius* (cf. figs. 8, 9). Very shallow but distinct longitudinal excavations usually present on some of the mid-body tergites, a shallow median excavation often present on the proximal third of the ultimate pedal sternite (fig. 7). The supracoxal pleural sclerites tend to be more numerous, segment ten frequently with four substigmatal sclerites, whereas specimens of *sexspinosus* from the same locality (Sevier County, Tennessee) show but a single substigmatal sclerite. Ultimate legs of both sexes densely or subdensely pilose,[8] the prefemur glabrous, whereas the entire ultimate leg of either sex of *sexspinosus* is glabrous except for an occasional solitary seta in rare cases (figs. 1, 2).

Besides those mentioned above, I have examined many specimens of *nigridius* from the following localities: Virginia, Stoney Point; Charlottesville; Botetourt County; Grayson County; Pittsylvania County; Rockingham County. Alabama, Fayette. Kentucky, Magoffin County. South Carolina, Florence.

Otocryptops sexspinosus (Say)

An examination of specimens ranging from northern Florida up the Appalachians and the Atlantic coastal plain shows them

[8] It seems impossible to correlate sex with any external morphological feature in *Otocryptops* in one hundred per cent of the cases. Although it is true that in any one locality there is an apparent tendency for the male ultimate leg to be shorter and more robust (and more densely hirsute in the case of *nigridius*) than that of the female, it is also true that a certain percentage of the males will not conform to these rules. So far as I know, the examination of the concealed genito-anal segments remains the only sure method of determining sex in the genus.

to be apparently conspecific, the variations being in size and relative proportions as is usual in the genus. The southern specimens average considerably larger in size due to the longer growing season.

Otocryptops rubiginosus (Koch)

At present unknown from either the eastern or western United States, this species is apparently common in the midwest and in Alaska. I have examined specimens from the following localities: Nebraska, Barada; Rulo; Barnston. Kansas, Geary County; Pottawatomie County; Riley County. Illinois, Rock Island; Galesburg. Iowa, Boonesboro (sic); Davenport. Attems also reports the species from Minnesota.[9]

Key to the Species of *Otocryptops* Now Known to Occur East of the Rocky Mountains

1a. No tergite with complete longitudinal paramedian sulci...2
1b. Complete longitudinal paramedian sulci beginning on tergite two, three, or four.....3
2a. First antennal article sparsely hirsute and contrasting markedly with second densely hirsute article; general body color orange shading to dark orange-reddish, no blue or purplish splotches present anywhere on body, ventral leg areas immaculate white.....*sexpinosus* (Say)
2b. First and second antennal articles sparsely hirsute and contrasting markedly with the densely hirsute third article; general body color very dark, sordid red suffused with a greenish hue, all parts of the body with very distinct localized aggregations of tiny bluish or purplish splotches, the ventral leg areas always distinctly peppered with tiny bluish or purplish splotches, never immaculate white.....
.....*nigridius* (McNeill)
3a Cephalic plate with a well-defined lateral margin; sternites entirely without median longitudinal sulci.....
.....*rubiginosus* (Koch)
3b Cephalic plate without a lateral margin; sternites with well-defined median longitudinal sulci; second tergite entirely without complete sulci, third tergital sulci incomplete anteriorly; ultimate leg prefemur densely hirsute.....
.....*gracilis peregrinator* new subspecies

[9] Attems: loc. cit.